

THURSDAY, AUGUST 3, 1911.

ZOOGEOGRAPHY.

Bartholomew's Physical Atlas, vol. v., Atlas of Zoogeography: a Series of Maps Illustrating the Distribution of over Seven Hundred Families, Genera, and Species of Existing Animals. Prepared by Dr. J. G. Bartholomew, W. Eagle Clarke, and P. H. Grimshaw. Pp. viii+67+36 plates+xi. (Edinburgh: J. Bartholomew and Co., 1911.) Price 2l. 12s. 6d. net.

THE fifth volume of "Bartholomew's Physical Atlas" is devoted to "Zoogeography"—that is, as the word clearly indicates, the science of the distribution of animal-life over the world's surface. Little was known and still less was understood about this branch of zoology in former years. But when the "Origin of Species" began to be discussed it was quickly perceived how closely the localities of animals and plants are connected with their affinities, and how important "zoogeography" is to the student of animal and vegetable life. Linnæus and his immediate followers did not understand this. They thought that such terms as "East Indies" or "Brazil" were quite sufficient indications of the locality of an animal. But, as the science of zoology advanced, authors became gradually more particular as to their localities, and nowadays unless the place of origin is exactly known a specimen loses at least half its value. In early days the faunal character of each geographical area was supposed to depend entirely on its climatic and physical peculiarities. This idea, however, has been abundantly proved to be incorrect. In many cases tracts of the world's surface exactly similar in climate and in other physical conditions can be shown to be entirely different as regards their animal life. It was not until the theory that the descent of animals is accompanied by modifications of their structure became appreciated that any correct views were put forward on the laws of their geographical distribution. The authors of the present work describe the commencement of this new period as follows:—

"The first attempt to map out a set of zoogeographical regions, based upon the actual distribution of species, and apart altogether from purely geographical considerations, was made by Dr. P. L. Sclater. This eminent zoologist, who is, fortunately, still living, read a paper before the Linnean Society of London, in June, 1857, entitled 'On the General Geographical Distribution of the Members of the Class Aves.' Taking as his basis the Passerine, or 'Perching' Birds, he proposed the division of the earth into six great regions, which he defined geographically, and whose area in square miles he roughly estimated. At the same time, he furnished a tabulated statement of the number of species found in each region, and gave an indication of the peculiar and characteristic genera. As this paper was an epoch-making one, and as its divisions correspond very closely with the main regions adopted in most of the schemes since proposed, it is perhaps desirable to quote the main features before proceeding further."

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The authors then proceed to enumerate the six great "regions" into which Dr. Sclater had proposed to divide the earth's surface for zoological purposes, adding in each case a short description of their boundaries and estimated areas, also a rough calculation of the number of species of birds then known to be found in each of them. These six regions were as follows:—(1) The Palearctic region (embracing Europe and North Asia, and the northern part of North Africa); (2) the Ethiopian region (Africa, except the portion north of the Sahara); (3) the Indian region (southern Asia and the adjacent islands); (4) the Australian region (Australia and the Pacific Islands); (5) the Nearctic region (North America); and (6) the Neotropical region (South and Central America).

The publication of Dr. Sclater's article induced many other zoologists to state their views on the subject. Günther, Blanford, Huxley, Heilprin, and Blyth were among the number. Many of them agreed more or less with Dr. Sclater's proposals, but offered criticisms on particular points, and suggested emendations of his nomenclature. But in 1876 appeared Dr. Wallace's classical and important work, "On the Geographical Distribution of Animals," which combined all that had been previously known on the subject with the knowledge acquired by the travels and experiences of this great naturalist. In this work Dr. Wallace absolutely adopted Dr. Sclater's division of the world into six great regions and his nomenclature, only suggesting that the name of the "Indian" region should be changed to the "Oriental" region, an improvement which subsequent authors have been generally willing to agree to.

Dr. Wallace, after fully considering the question, states decisively his reasons for adopting the six zoological regions proposed by Dr. Sclater as follows:—

"So that we do not violate any clear affinities or produce any glaring irregularities, it is a positive, and by no means an unimportant advantage to have our regions approximately equal in size, and with easily defined, and therefore easily remembered, boundaries. All elaborate definitions of interpenetrating frontiers, as well as regions extending over three-fourths of the land-surface of the globe, and including places which are the antipodes of each other, would be most inconvenient, even if there were not such great differences of opinion about them. There can be little doubt, for example, that the most radical zoological division of the earth is made by separating the Australian region from the rest; but although it is something useful and definite to know that a group of animals is peculiar to Australia, it is exceedingly vague and unsatisfactory to say of any other group merely that it is extra-Australian. Neither can it be said that, from any point of view, these two divisions are of equal importance. The next great natural division that can be made is the separation of the 'Neotropical' region of Dr. Sclater from the rest of the world. We should thus have three primary divisions, which Prof. Huxley seems inclined to consider as of tolerably equal zoological importance. But a consideration of all the facts, zoological and palæontological, indicates that the great northern division (Arctogæa) is fully as much more important than either Australia or South America, as its four component parts are less

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important; and, if so, convenience requires us to adopt the smaller rather than the larger divisions."

Convinced by these weighty arguments, the authors of "Zoogeography" adopt the six Sclaterian regions without exception, and use them throughout their work, making only the change of the name of the "Indian" region into the "Oriental" region, as was suggested by Dr. Wallace. They take these six regions one after the other, and describe their extent, the best mode of their division into subregions, their most obvious physical features, and the chief zoological characteristics which distinguish them. One of the more difficult points to be considered is the relation of North America to the Palæarctic region. So similar in many respects are their faunas that Heilprin had proposed to unite them under one name as the "Holarctic" region, which has met with approval by Huxley, Newton, Lydekker, and other writers. But after discussing the question, our authors follow Wallace in rejecting Heilprin's proposal, and give good reasons for doing so.

The third and most important part of the present work is the zoological section, to which we must now direct attention. It is obvious that an exact knowledge of the general distribution of animal life must be based on a thorough acquaintance with the particular distribution of each species. But, as is well pointed out in the present work, the distribution of animal life in many areas "has not been investigated in sufficient detail to afford the necessary data, and in such cases it is impossible to define the range of species with precision." Moreover, in many groups of animal life, especially in the lower forms, the species are so multitudinous, and as yet so little known, that they cannot be used for such a purpose. But all the higher forms, such as mammals, birds, reptiles, and amphibians have been dealt with in this work, besides the more important families of fishes, and a selection of the better-known groups of insects and molluscs. The zoological portion of the letterpress of "Zoogeography" occupies some forty-four pages of two columns each, and seems to be very complete, though it involves a mass of details, which it must have been a hard task to put together and to arrange in order.

Following this portion of the work is a "bibliography," containing the titles of the separate books and the principal articles published in journals relating to zoological distribution. This, we think, though useful as it is, might have been improved by the addition of the names of the leading authorities on the faunas of each of the different parts of the world, something like that which was given by Dr. Sclater in his presidential address to the Biological Section of the British Association at Bristol in 1875. It must be admitted, however, that such a list, though of much value, would have somewhat inconveniently increased the bulk of the "bibliography."

We now come to the maps, the most important feature in the work, which have been planned to illustrate the distribution over the world's surface "of more than seven hundred families, genera, and species of existing animals." It is to be regretted that the

extinct forms of animal life have been altogether unnoticed, as they serve to explain in some degree the anomalies of the present state of distribution. That the task of inserting them would have been serious it must be confessed. We observe that the dodos (*Dididæ*) have been mentioned. But we think that a few words might also have been devoted to the moas (*Dinornithidæ*) of New Zealand, the rocs (*Æpyornithidæ*) of Madagascar, and to other forms which have only recently become extinct. Taken as a whole the thirty-six plates of the atlas are excellent, and fully sustain the claim of the great firm which has produced this handsome volume to issue nothing but first-class work.

In books of this kind, accompanied by a large number of illustrations, there are often slight discrepancies between the plates and the descriptions of them in the text. We find nothing of this sort in the present work, in which it is obvious that the main object of the text has been the description and explanation of the illustrations. In fact, we consider that Mr. Bartholomew and his enterprising firm deserve the greatest credit for the production of the fifth volume of their "Physical Atlas," which, we are sure, will long remain the leading authority on "zoogeography."

CENTRAL ASIA.

L'Asia Centrale: noti di viaggio e studi di un Diplomatico giapponese. By Nisci Tocugiro (Nishi Tokujiro). Translated by L. Nocentini. Pp. xxx+317. (Turin: Unione Tipografico-Editrice Torinese, 1911.) Price 4.50 lire.

THE distinguished Sinologist, Prof. Lodovico Nocentini, has translated into Italian an interesting Japanese work on the geography, ethnography, and political conditions of Central Asia, which was written a quarter of a century ago by Mr. Nishi Tokujiro (or Tokujiro Nishi, as we should say), then First Secretary of the Ministerial Council at Tokyo. The translation, with additions and notes by the translator, which bring it up to date, has now been presented to the Italian Geographical Society, with a preface by the president of that body, Signor Cappelli. Mr. Nishi has been prevented by other work from adding new material to the book himself.

In 1880 Nishi Tokujiro, then attached to the Imperial Legation at St. Petersburg, left on his homeward journey by way of Central Asia, passing through Russia and Chinese Turkestan on the way, and this volume, produced in 1885, was the result of his *noti di viaggio* and general knowledge. When published it would, had it been translated promptly, have been of great interest, and even now, with the addition of Prof. Nocentini's notes, it is valuable as a general account of Central Asia. For non-Italian readers, however, its value is somewhat discounted by the unscientific transliteration of all names, whether Russian, Chinese, Turki, or what-not, into a guise which, though it may reproduce the correct sounds of the originals to an Italian reader, is confusing to those of other nations, who have to re-transliterate into the forms familiar to them. What English or German